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Publication number:

**0 455 742 B1**

(12)

## EUROPEAN PATENT SPECIFICATION

(43) Date of publication of patent specification: 29.03.95 (51) Int. Cl.<sup>8</sup>: A61J 3/07, B29C 43/22

(21) Application number: 90903554.5

(22) Date of filing: 23.01.90

(96) International application number:  
PCT/US90/00386

(87) International publication number:  
WO 90/08527 (09.08.90 90/19)

(54) TEXTURED SOFTGELS AND METHOD AND APPARATUS FOR THE MANUFACTURE THEREOF.

(30) Priority: 26.01.89 US 302424

(43) Date of publication of application:  
13.11.91 Bulletin 91/46

(45) Publication of the grant of the patent:  
29.03.95 Bulletin 95/13

(84) Designated Contracting States:  
AT BE CH DE DK ES FR GB IT LI LU NL SE

(58) References cited:  
WO-A-87/00817  
GB-A- 758 642  
US-A- 3 374 303

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## Description

### BACKGROUND OF THE INVENTION

This invention relates to textured softgels (or soft gelatin capsules) and to a process and apparatus for the manufacture thereof.

Soft gelatin capsules, now more commonly known as softgels, have been well known and widely used for many years. Softgels generally comprise an outer shell primarily made of gelatin, a plasticizer, and water, and a fill contained within the shell. The fill may be selected from any of a wide variety of substances that are compatible with the gelatin shell. Softgels are widely used in the pharmaceutical industry as an oral dosage form containing many different types of pharmaceutical and vitamin products. In addition to use as an oral dosage form for drugs and vitamins, soft gelatin capsules or softgels are also designed for use as suppositories for rectal or vaginal use. Other uses are for topical and ophthalmic preparations and the like. The cosmetic industry also uses softgels as a specialized package for various types of perfumes, oils, shampoos, skin creams and the like. Softgels are available in a great variety of sizes and shapes, including round shapes, oval shapes, oblong shapes, tube shapes and other special types of shapes such as stars. The finished capsules or softgels can be made in a variety of colors. Also, opacifiers may be added to the shell.

Although softgels can be made in a wide variety of shapes, sizes and colors, because of the wide range of use of softgels, there is a definite need to provide other means of identification. In this regard, it is quite common today to have an indicia of some type printed on each softgel after formation. The printing material may be any suitable dye or pigment. In some equipment, this has the disadvantage of requiring the use of an additional machine that will align the softgels and hold them in a desired oriented position for the application of the dye or ink. The use of additional equipment and procedural steps adds to the overall cost of manufacture of the softgels and, therefore, this system is considered disadvantageous. Also, the printing of each softgel can be done over only a limited portion of the exterior surface of the softgel and may not be readily read or even seen by the consumer. Specific examples of known processes and machines used for applying some type of identification on the softgels are those shown, for example, in Power (Posner) Patent No. 2,449,139; Scherer Patent No. 2,623,494; Scherer Patent No. 2,698,775; Scherer Patent No. 2,703,047; Taylor Patent No. 3,124,840; Hansen Patent No. 3,203,347; and Vincent Patent No. 3,333,031.

The Posner Patent shows gelatin as one possible type of system that can be used in connection with an apparatus for manufacturing and filling capsules. In this patent, as seen best in Figure 9 thereof, a tube of gelatin is formed and then a textured brand is applied to a portion of the outer surface of the tube. The capsule is then filled and sealed. This apparatus is used in quite a different system from the rotary die process which is probably the most common type of machine used for manufacturing softgels today. The rotary die process is described in some detail in Stanley's Chapter 13 of Lachman, Lieberman, and Kanig, *The Theory and Practice of Industrial Chemistry* - (Copyright Lea & Febiger, 1970). In the rotary die process for manufacturing softgels, two gelatin ribbons are prepared, fed simultaneously to the fill area, and simultaneously and continuously filled, formed, hermetically sealed, and automatically cut between two rotary dies. The disclosure in the article by Stanley, as identified above, is incorporated into this specification by reference as being quite fully descriptive of the rotary die process, with which the present invention is involved, as opposed to the process disclosed in the Power patent.

The Scherer Patent No. 2,623,494 relates to a banding machine for softgels. In this machine, the identifying band is applied to each individual capsule after the capsule is formed.

The Scherer Patent No. 2,688,775 shows a method for applying a brand to the exterior surface of a gelatin capsule.

The Scherer Patent No. 2,703,047 discloses a similar system of branding the filled capsules.

In the Taylor Patent No. 3,124,840, a printing element is provided in order to print on the gelatin strip prior to the formation of the capsule.

The Hansen Patent No. 3,203,347 shows a marking fluid that is printed on the gelatin ribbon used to make the softgels.

The Vincent Patent No. 3,333,031 shows drying of the gelatin strip before capsule formation.

Metz Patent No. 3,374,303 is concerned with a method for manufacturing imprinted plastic film in which the polyolefin film is embossed by an impression roller while it is cooling. However, this invention is not related to softgel manufacture.

Even though efforts have been made to manufacture gelatin capsule and distinguish them from those of others by using different shapes, sizes, colors, color combinations, branding, banding, and printing, there still is a need to provide a way to even more uniquely identify one company's product from that of another while accomplishing this in a very unique, economical, and simplified manner.

## SUMMARY OF THE INVENTION

It is therefore an important object of this invention to provide a unique process and apparatus by which softgels have a fully or partially texturized or patterned outer surface prepared in a highly economical way by applying a suitable texture to the outer surface of both ribbons, in a rotary die process and prior to softgel formulation, so that the softgels will be highly distinct from those manufactured by others and where the manufacturing process does not involve the use of additional equipment and processing steps of the type needed to mark, brand, print, or band previously formed capsules.

It is another object of the present invention to provide a unique method and apparatus which involves applying a suitable pattern or texture to the outer periphery of a gelatin ribbon used to form a softgel while the ribbon is still in a molten or flowable state so as to conveniently accept the addition of the desired texture or pattern.

It is still a further object of the present invention to provide an apparatus and process for applying a texture to one or both ribbons of gelatin used in the rotary die process used for making softgels wherein the apparatus is particularly economical in construction and the method utilized is particularly economical in use.

It is yet a further object of the present invention to provide a unique softgel capable of having a texture over its entire surface.

Further purposes and objects of the present invention will appear as the specification proceeds.

According to the invention, there is provided a process for imparting a texture to the surface of softgels produced by the rotary die method, said process comprising the steps of forming a flowable gelatin mass, providing a rotary drum having an outer surface, controllably directing said flowable gelatin mass to said outer surface of said drum, forming a gelatin ribbon of substantially uniform thickness on said outer surface of said drum, providing a second gelatin ribbon, said ribbons being initially in a relatively softer and mouldable state immediately following said directing step, forming a plurality of filled softgels from said ribbons by use of said rotary die method, characterised in that:

at least one of said ribbons is passed while in said relatively softer and mouldable state between said rotary drum outer surface and a roller, the roller having a textured surface, said roller being positioned closely adjacent to said outer surface of said drum, while applying sufficient pressure to said roller towards said drum to cause said textured surface to impart a matching texture on the outer surface of said ribbon, said matching texture defining the outer surface of at least a portion of

each softgel.

## BRIEF DESCRIPTION OF THE DRAWINGS

One particular embodiment of the present invention is descriptively shown in the accompanying drawings wherein:

Figure 1 is a schematic drawing showing the basic apparatus components of the rotary die process for making softgels;

Figure 2 is a side elevational view showing the portion of the rotary die process equipment, of the type schematically shown in Figure 1 specifically locating the portion of the apparatus used to impart a texture to the outer periphery of the gelatin ribbon prior to capsule formation;

Figure 3 is a top plan view of the apparatus depicted in Figure 2;

Figure 4 is a detailed side elevational view of the texturing roller and the mounting therefor which is used to apply texture to the outer periphery of the gelatin ribbon;

Figure 5 is a view of the texturing apparatus depicted in Figure 4, taken along the line 5-5;

Figure 6 is a top plan view of one type softgel upon which a textured surface has been imparted by the use of the apparatus as shown in Figures 1-5; and

Figure 7 is a sectional view taken along the line 7-7 of Figure 6.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The rotary die process machine, generally 10, is schematically illustrated in Figure 1. The principal parts thereof include a gelatin metering device or spreader box, generally 12, and a gelatin ribbon casting and cooling rotary drum 14 upon which the first gelatin ribbon 16 is formed. For convenience in illustration, only one spreader box 12 and one rotary drum 14 are illustrated in Figure 1. Since the rotary die process uses two gelatin ribbons, the second being designated as 18, it is to be understood that a similarly situated spreader box (not shown in Figure 1) and rotary drum (not shown in Figure 1) are utilized in connection with the formation of the second gelatin ribbon 18.

The rotary die process machine 10 further includes a tank 20, generally containing a liquid fill material which is any of a wide variety of substances both of an edible nature, such as vitamins and pharmaceuticals, or of an inedible nature, including oils, bath soaps, and the like. The fill material 22 contained in the tank 20 flows to a fill pump 23 which meters the volume of the fill material which passes through a line 24 to an injection wedge 26. The narrowed lower end of the wedge

26 is constructed and shaped to be located between a pair of rotary dies, generally 28, which contain matching die pockets 31. The rotary dies 28 rotate in the direction designated by the arrows 29 shown in Figure 1. The fill material 22 passes through the filling wedge 26 into the space formed in the gelatin by the die pockets 31 formed by and between the rotary dies 28 where the softgels 30 are filled, shaped, hermetically sealed and cut from the gel ribbons 16 and 18 using conventional techniques. The filled capsules or softgels 30 which are formed are dropped into collecting chutes 33 where they fall down onto a conveyor 32. The gelatin net 34 which remains after the capsules 30 are cut is then passed on for collecting and reuse in a known manner.

The rotary die machine 10, as described, is generally a conventional type of machine used for making gelatin capsules or softgels. Although there is nothing considered unique in the machine, as described above, it is, nevertheless, considered advantageous to have a full understanding of the rotary die process in order to have a full understanding of the overall process for manufacturing the capsules 30 which have the textured appearance as depicted in Figures 6 and 7. In Figure 1, there is no illustration of the texturing apparatus, generally 36, which is used for applying the textured outer periphery to the outer surface of the gelatin ribbons 16 and 18 which have been formed on the rotary casting and cooling drums 14. The texturing apparatus 36 which is the general subject of the present invention, is best illustrated in Figures 2-5 herein. As stated previously, the disclosure of the rotary die process in Chapter 13 by Stanley, identified above, is incorporated herein by reference.

Referring to Figures 2 and 3, the texturing apparatus 36 is shown in greater detail. A machine frame 38 is generally illustrated in Figure 2, and the cooling and casting rotary drum 14 is rotatably mounted about its transverse axis 40. The texturing apparatus 36 is mounted closely adjacent and below the spreader box 12. Cylindrical outer surface 52 of the texturing apparatus 36 is placed sufficiently close to the spreader box 12 so that the gelatin ribbon 16 or 18 is formed on the outer peripheral surface 42 of the drum 14. The texturing apparatus 36 is positioned so that the ribbon 16 is in a suitable softened and moldable condition to have a suitable texture applied to its exterior surface, that is, the ribbon 16 should be sufficiently softened and moldable so as to accept the desired textured surface being applied thereto by the texturing apparatus 36. Referring to Figure 6, it is seen that the outer surface of the capsule 30 has a texture of raised ribs 44 provided thereon. It is to be understood, however, that the texture for the

capsules can vary over a wide range.

A texturing location is generally illustrated in the shaded area 46 as seen best in Figure 2. This area represents a segment of up to approximately 45 degrees along the outer periphery of the drum 14 and extends from the lower, open end of the spreader box 12. If the texturing apparatus 36 is positioned beyond the texturing area 46, where the gelatin is applied to the outer periphery 42, it is unlikely that the ribbon 16 or 18 will accept a texture because the ribbon will have sufficiently hardened on the casting and cooling rotary drum 14, which rotates in the direction indicated by the arrow 48 in Figure 2.

Referring to Figures 3-5, the texturing apparatus 36 will be described in greater detail. As seen in Figure 5, a base plate 50 is mounted on the frame 38 of the rotary die process machine 10. A cross support 54, as best seen in Figures 4 and 5, is mounted on the base plate 50 at a preselected angle. An upright angled rib 56 angularly mounts the cross support 54 to the base plate 50. The cross support 54 is elongated and at its opposite ends, has a texturing roller assembly 58 operatively mounted at either end thereof for the texturing of each ribbon 16 and 18. The roller assembly, generally 58, includes an elongated roller 60 having a textured outer periphery 62. The roller 60 is approximately the same width as the drum 14 and is rotatable about the transverse axis 64 which is parallel to the axis 40 of the rotary casting and cooling drums 14. Each roller 60 is biased or spring mounted towards the drum 14.

The axis 64, of each roller assembly 60, has the outer ends thereof interconnected to a threaded rod 66. Each threaded rod 66 is substantially transverse or perpendicular to the axis 64. A retaining washer 68 is mounted on the lower end of each of the threaded rods 66. A compression spring 70 is positioned between the retaining washer 68 and the cross support 54 in such a way that the springs 70 are biased to apply pressure in a radial direction, forcing the roller 60 and its peripheral textured surface 62 towards or against the outer peripheral surface 42 of the casting drum 14.

Desirably, the pressure applied by the spring 70 is adjustable by the adjusting assembly, generally 72, located at the upper end of each of the threaded rods 66. Desirably, a spacer 74 is mounted between the cross support 54 and the upper retaining washer 74. An adjustment nut 76 is threadably mounted at the upper end of the threaded rod so that by adjusting the nut 76 along the length of the threaded rod 66, the desired amount of pressure can be applied by the spring 70 so the outer textured surface 62 of the roller 60 bears towards the outer surface 42 of the rotary drum 14 with the ribbon 16 or 18 therebetween.

In practicing the process for imparting the desired texture to the outer periphery of the ribbons 16 and 18, so that a textured outer periphery is provided on the capsules 30, attention is directed to the drawings. The spreader box 12 is filled with a molten, flowable gelatin of a conventional formulation well known to those skilled in the art. The shell formulation, generally comprising water, gelatin and a plasticizer passes through the spreader box and is applied initially in liquid form against the outer periphery of the rotating cooling and casting drum 14. The gelatin sheet or ribbon of suitable thickness is desirably placed against the outer surface of the drum 14 and upon counterclockwise direction of the drum 14, as viewed in Figure 2, in the direction of the arrow 48, the texturing apparatus immediately comes into contact with the outer periphery of the gelatin ribbon 16 while it is still in a flowable, or moldable condition.

It is to be understood that the specific condition of the amount of pressure applied by the texturing roll against the outer periphery of the ribbon is dependent upon an operator of ordinary skill in the art who is well capable of setting up the equipment in the proper manner. This is considered to be well within the skills of one of ordinary skill in the art and is dependent upon a variety of factors, including the nature of the shell formulation, ambient conditions, the temperature of the rotary drum 14, and the desired thickness to be imparted to the ribbon 16, which is dependent upon its end use. Desirably, the outer periphery of the roller 60 has a lubricant, such as mineral oil, applied, by suitable means, such as a brush (not shown), to its outer surface, in order to assure that there is no sticking of the gelatin ribbon to the texturing roller 60 once the texture has been applied thereto. The operator adjusts the pressure of roller 60 as the ribbon passes between the outer textured surface 62 of the roller assembly 58 and the outer peripheral surface 42 of the casting drum 14.

As seen in Figure 1, and as previously described, once the ribbon has been formed with the desired texture thereon, it passes around to the rotary dies 28 with the wedge 26 therebetween for directing the fill 22 into the space between the two ribbons 16 and 18 as they come together between the rotary dies 28.

The capsules 30 thus formed are as illustrated in Figure 6. In this particular capsule, shown in Figure 6, the capsule 30 has the shape of a star and the texture on the outer surface thereof has raised ribs which are complementary to the peripheral grooves that are located on the outer periphery of the textured surface 62 of the roller 60. In the present invention, it is important to have the capability of providing a texture over the entire softgel

periphery, which was not possible with the prior art techniques. Also, it is to be understood that, in certain applications, the textured surface can define the inner surface of the shell capsule as opposed to the outer surface thereof. It is thus believed that all objects previously set forth have been accomplished.

While in the foregoing there has been provided a detailed description of one particular embodiment of the present invention, it is to be understood that all equivalents obvious to those of ordinary skill in the art be included within the scope of the invention as defined in the following claims.

## Claims

1. A process for imparting a texture to the surface of softgels produced by the rotary die method, said process comprising the steps of forming a flowable gelatin mass, providing a rotary drum (14) having an outer surface (42), controllably directing said flowable gelatin mass to said outer surface (42) of said drum (14), forming a gelatin ribbon (16) of substantially uniform thickness on said outer surface (42) of said drum (14), providing a second gelatin ribbon (18), said ribbons (16, 18) being initially in a relatively softer and mouldable state immediately following said directing step, forming a plurality of filled softgels (30) from said ribbons (16, 18) by use of said rotary die method, characterised in that:

at least one of said ribbons (16, 18) is passed while in said relatively softer and mouldable state between said rotary drum outer surface (42) and a roller (60), the roller having a textured surface (62), said roller (60) being positioned closely adjacent to said outer surface (42) of said drum (14), while applying sufficient pressure to said roller (60) towards said drum to cause said textured surface (62) to impart a matching texture on the outer surface of said ribbon, said matching texture defining the outer surface of at least a portion of each softgel (30).

2. A process according to claim 1 wherein both of said ribbons (16, 18) are passed between said rotary drum outer surface (42) and rollers (60) in order to impart said matching texture on the outer surface of both ribbons (16, 18).

3. An apparatus for imparting a texture to the surface of softgels using a rotary die machine, said apparatus comprising, in combination, means containing a flowable gelatin mass, a rotary drum (14) having an outer surface (42), means for controllably directing such a flowa-

ble gelatin mass to said outer surface (42) of said drum (14), said directing means and said drum (14) being operatively interrelated for forming a gelatin ribbon (16) of substantially uniform thickness on said outer surface (42), means for forming a second gelatin ribbon (18), said ribbons (16, 18) being initially in a relatively softer and mouldable state immediately following said directing step, means for forming a plurality of filled softgels (30) from said gelatin ribbons (16, 18), characterised in that:

said apparatus comprises at least one rotary roller (60), the roller having a textured surface (62) closely adjacent to said outer surface (42) of said drum (14), means for applying sufficient pressure to said roller (60) towards said drum (14) while at least one of said ribbons (16, 18) passes between said textured surface (62) and said outer surface (42) of said drum (14) for forming a matching texture on said outer surface of said ribbon, said matching texture defining the outer surface of at least a portion of said softgels.

4. An apparatus according to claim 3 comprising two rollers (60) and means for applying sufficient pressure to said rollers towards said drum (14) while both of said ribbons (16, 18) pass between said textured surfaces (62) and said outer surface (42) of said drum (14) for forming said matching texture on said outer surface of both ribbons (16, 18).
5. A textured softgel (30) obtainable by the process of claim 1 or 2, comprising an outer gelatin shell containing a fill material (22), said outer shell having walls having a texture over the entire surface thereof.
6. A capsule obtainable by the process of claim 1 or 2, comprising:
  - a soft gelatin shell moulded from first and second gelatin ribbons (16, 18) in a rotary die, at least one of said ribbons being provided with a predetermined textured outer surface prior to entry into said rotary die; and
  - a fill material (22) contained within said soft gelatin shell.
7. A capsule as claimed in claim 6 wherein said predetermined textured outer surface is formed by said at least one of said ribbons (16, 18) engaging with a textured roller (60).
8. A capsule as claimed in claim 6 or 7 wherein said first and second gelatin ribbons (16, 18) have said predetermined textured outer sur-

face.

#### Patentansprüche

1. Verfahren zum Aufbringen einer Textur auf die Oberfläche von durch das Drehformverfahren erzeugten Weichkapseln, wobei das Verfahren die Schritte aufweist:  
Bilden einer fließfähigen Gelatinemasse, Vorsehen einer Drehtrommel (14) mit einer Außenoberfläche (42), steuerbares Richten der fließfähigen Gelatinemasse zu der Außenoberfläche (42) der Trommel (14), Bilden eines Gelatinebands (16) im wesentlichen gleichmäßiger Dicke auf der Außenoberfläche (42) der Trommel (14), Vorsehen eines zweiten Gelatinebands (18), wobei sich die Bänder (16, 18) unmittelbar nach dem Schritt des Richtens anfangs in einem relativ weichen und formbaren Zustand befinden, Formen einer Mehrzahl gefüllter Weichkapseln (30) aus den Bändern (16, 18) unter Verwendung des Drehformverfahrens,  
**dadurch gekennzeichnet, daß:**  
wenigstens eines der Bänder (16, 18) in dem relativ weichen und formbaren Zustand zwischen der Außenoberfläche (42) der Drehtrommel und einer Rolle (60) hindurchtritt, wobei die Rolle eine texturierte Oberfläche (62) aufweist, wobei die Rolle (60) der Außenoberfläche (42) der Trommel (14) eng benachbart angeordnet ist, während ein ausreichender Druck auf die Rolle (60) zu der Trommel hin anliegt, um zu bewirken, daß die texturierte Oberfläche (62) eine passende Textur auf die Außenoberfläche des Bands aufbringt, wobei die passende Textur die Außenoberfläche wenigstens eines Abschnitts jeder Weichkapsel (30) festlegt.
2. Verfahren nach Anspruch 1, in dem beide Bänder (16, 18) zwischen der Außenoberfläche (42) der Drehtrommel und den Rollen (60) hindurchtreten, um die passende Textur auf die Außenoberfläche beider Bänder (16, 18) aufzubringen.
3. Vorrichtung zum Aufbringen einer Textur auf die Oberfläche von Weichkapseln unter Verwendung einer Drehformmaschine, welche Vorrichtung in Kombination umfaßt:  
ein Mittel, das eine fließfähige Gelatinemasse enthält, eine Drehtrommel (14) mit einer Außenoberfläche (42), ein Mittel zum steuerbaren Richten einer solchen fließfähigen Gelatinemasse auf die Außenoberfläche (42) der Trommel (14), wobei das Mittel zum Richten und die Trommel (14) zur Bildung eines Gelatine-

bands (16) im wesentlichen gleichmäßiger Dike auf der Außenoberfläche (42) betriebsmäßig in Beziehung stehen, ein Mittel zum Bilden eines zweiten Gelatinebands (18), wobei sich die Bänder (16, 18) unmittelbar nach dem Schritt des Richtens anfangs in einem relativ weichen und formbaren Zustand befinden, ein Mittel zum Formen einer Mehrzahl gefüllter Weichkapseln (30) aus den Gelatinebändern (16, 18), **dadurch gekennzeichnet**, daß die Vorrichtung aufweist: wenigstens eine Drehrolle (60), welche eine der Außenoberfläche (42) der Trommel (14) eng benachbarte texturierte Oberfläche (62) aufweist, ein Mittel zum Anlegen eines ausreichenden Drucks auf die Rolle (60) zu der Trommel (14) hin, während wenigstens eines der Bänder (16, 18) zwischen der texturierten Oberfläche (62) und der Außenoberfläche (42) der Trommel (14) hindurchtritt, um eine passende Textur auf der Außenoberfläche des Bands zu bilden, wobei die passende Textur die Außenoberfläche wenigstens eines Abschnitts der Weichkapseln festlegt.

4. Vorrichtung nach Anspruch 3, die zwei Rollen (60) und ein Mittel zum Anlegen eines ausreichenden Drucks auf die Rollen zu der Trommel (14) hin aufweist, während beide Bänder (16, 18) zwischen den texturierten Oberflächen (62) und der Außenoberfläche (42) der Trommel (14) hindurchtreten, um die passende Textur auf der Außenoberfläche beider Bänder (16, 18) zu formen.
5. Texturierte Weichkapsel (30), erhältlich durch das Verfahren der Ansprüche 1 oder 2, umfassend eine äußere Gelatineschale, die ein Füllmaterial (22) enthält, wobei die äußere Schale Wände aufweist, die über ihre gesamte Oberfläche eine Textur aufweisen.
6. Kapsel, erhältlich durch das Verfahren nach Anspruch 1 oder 2, umfassend: eine weiche Gelatineschale, die aus ersten und zweiten Gelatinebändern (16, 18) in einer Drehform geformt ist, wobei wenigstens eines der Bänder vor dem Eintritt in die Drehform mit einer vorbestimmten texturierten Außenoberfläche versehen ist; und ein Füllmaterial (22), das in der weichen Gelatineschale enthalten ist.
7. Kapsel nach Anspruch 6, in der die vorbestimmte texturierte Außenoberfläche durch Eingriff wenigstens eines der Bänder (16, 18) mit einer texturierten Rolle (60) geformt ist.

8. Kapsel nach Anspruch 6 oder 7, in der die ersten und zweiten Gelatinebänder (16, 18) die vorbestimmte texturierte Außenoberfläche haben.

## Revendications

1. Procédé d'application d'une texture à la surface de gélules produites par le procédé à matrice rotative, le procédé comprenant des étapes de formation d'une masse de gélatine fluide, de disposition d'un tambour rotatif (14) ayant une surface externe (42), de direction réglable de la masse de gélatine fluide vers la surface externe (42) du tambour (14), de formation d'un ruban de gélatine (16) d'épaisseur pratiquement uni forme à la surface externe (42) du tambour (14), de disposition d'un second ruban de gélatine (18), les rubans (16, 18) étant initialement à un état relativement mou et moulable juste après l'étape de direction réglable, et de formation de plusieurs gélules remplies (30) à partir des rubans (16, 18) par utilisation du procédé à moule rotatif, caractérisé en ce que :

L'un au moins des rubans (16, 18) passe, alors qu'il est à l'état relativement mou et moulable, entre la surface externe (42) du tambour rotatif et un rouleau (60), le rouleau ayant une surface texturée (62), le rouleau (60) étant placé très près de la surface externe (42) du tambour (14), avec application d'une pression suffisante au rouleau (60) vers le tambour pour que la surface texturée (62) donne une texture complémentaire à la surface externe du ruban, la texture complémentaire délimitant la surface externe d'une partie au moins de chaque gélule (30).

2. Procédé selon la revendication 1, dans lequel les deux rubans (16, 18) passent entre la surface externe (42) du tambour rotatif et les rouleaux (60) afin que la texture complémentaire soit appliquée à la surface externe des deux rubans (16, 18).
3. Appareil d'application d'une texture à la surface de gélule par utilisation d'une machine à moule rotatif, l'appareil comprenant, en combinaison, un dispositif contenant une masse de gélatine fluide, un tambour rotatif (14) ayant une surface externe (42), un dispositif destiné à diriger de manière réglable la masse de gélatine fluide vers la surface externe (42) du tambour (14), le dispositif destiné à diriger et le tambour (14) étant interconnectés afin qu'ils forment un ruban de gélatine (16) d'épaisseur pratiquement uniforme à la surface externe

(42), un dispositif destiné à former un second ruban (18) de gélatine, les rubans (16, 18) étant initialement à un état relativement mou et moulable juste après l'étape de direction réglable, et un dispositif destiné à former plusieurs gélules remplies (30) à partir des rubans de gélatine (16, 18), caractérisé en ce que :

l'appareil comporte au moins un rouleau rotatif (60), le rouleau ayant une surface texturée (62) très proche de la surface externe (42) du tambour (14), un dispositif d'application d'une pression suffisante au rouleau (60) vers le tambour (14) lorsque l'un au moins des rubans (16, 18) passe entre la surface texturée (62) et la surface externe (42) du tambour (14) pour la formation d'une texture complémentaire à la surface externe du ruban, la texture complémentaire délimitant la surface externe d'une partie au moins des gélules.

4. Appareil selon la revendication 3, comprenant deux rouleaux (60) et des dispositifs d'application d'une pression suffisante aux rouleaux vers le tambour (14) lorsque les rubans (16, 18) passent entre les surfaces texturées (62) et la surface externe (42) du tambour (14) pour la formation de la texture complémentaire à la surface externe des deux rubans (16, 18).

5. Gélule texturée (30) qui peut être obtenue par le procédé de l'une des revendications 1 et 2, comprenant une enveloppe externe de gélatine contenant une matière de remplissage (22), l'enveloppe externe ayant des parois portant une texture sur toute sa surface.

6. Capsule qui peut être obtenue par le procédé de l'une des revendications 1 et 2, comprenant :

une enveloppe de gélatine molle moulée à partir d'un premier et d'un second ruban de gélatine (16, 18) dans une matrice rotative, l'un au moins des rubans ayant une surface externe texturée de manière prédéterminée avant l'entrée dans la matrice rotative, et une matière de remplissage (22) contenue dans l'enveloppe de gélatine molle.

7. Capsule selon la revendication 6, dans laquelle la surface externe de texture prédéterminée est formée dans l'un au moins des rubans (16, 18) placés au contact d'un rouleau texturé (60).

8. Capsule selon la revendication 6 ou 7, dans laquelle le premier et le second ruban de gélatine (16, 18) ont la surface externe de texture prédéterminée.



Fig.1

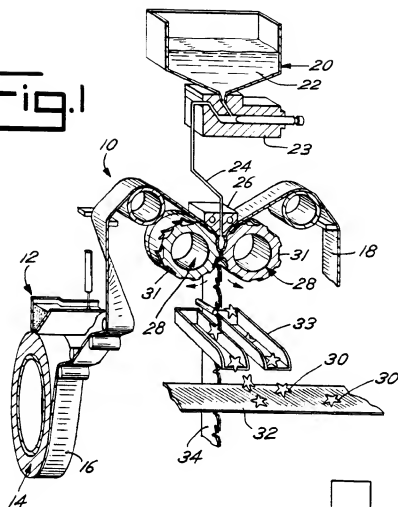


Fig.2

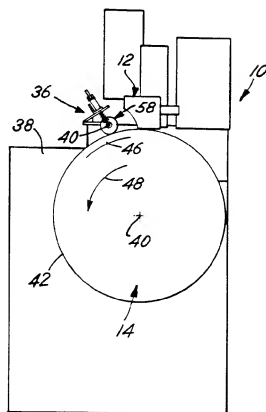


Fig. 3

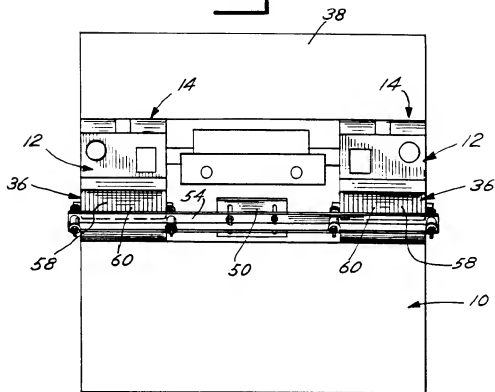


Fig. 4

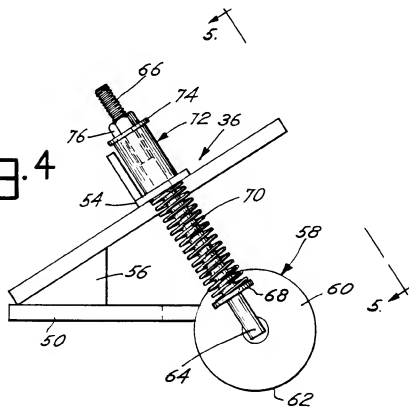


Fig. 5

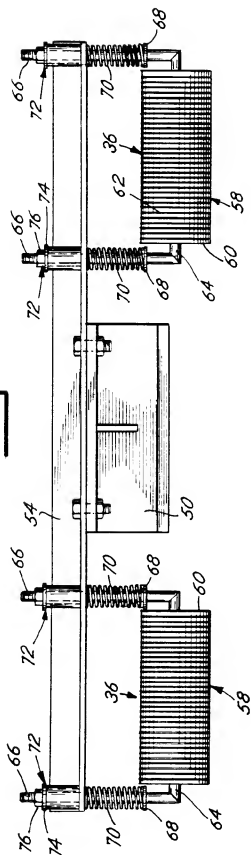


Fig. 6

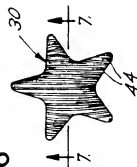


Fig. 7

